

Master List of GLOBE Key Concepts by Chapter

Atmosphere

- Cloud formation
- Composition of the atmosphere
- Cooling/warming effect of clouds
- Condensation
- Effects of wind on precipitation measurement
- Meniscus reading
- Change of state, heat capacity, density of snow
- Heat, temperature, convection, conduction, radiation
- Clouds are identified by their shape, altitude, and precipitation characteristics
- Using a simulation to explore the accuracy of observations
- Heat transfer through radiation, conduction, and convection
- Substances expand and contract as the temperature changes.
- Liquid-in-glass thermometers work on the basis of thermal expansion and contraction.
- Conduction and convection are two key forms of heat transfer.
- Different substances, such as soil, water, and air transfer energy and heat at different rates.
- Relationships of clouds and changes

Hydrology

- Temperature
- Temperature measurement
- Heat, heat transfer, conduction
- Accuracy, precision
- Dissolved oxygen
- Comparing with a standard
- pH and its measurement
- Temperature affects pH
- Calibration
- pH buffers and standards
- Alkalinity
- Natural factors affecting alkalinity
- Standardization
- Conductivity, factors affecting conductivity
- Surface water exists in many forms, such as: ponds, lakes, rivers, and snow cover. Water characteristics are closely related to the characteristics of the surrounding land. Water moves from one location to another. Surface water has many observable characteristics, such as: color, smell, flow, and shape.
- A watershed guides all precipitation and run off to a common watercourse or body of water. The Hydrology Study Site is part of a watershed. The nature of a watershed is determined by the physical features of the land.
- Quality assurance, quality control, reliability, accuracy, protocol, calibration
- Solutions, Suspensions
- pH measurements
- Each organism has a range of water characteristics needed for survival. Some have a wide range of water quality where they can live. These differences dictate adaptability to a changing environment. There are geographical patterns in water quality and annual survivability.



Soil

- Soil horizon, color, texture, root distribution
- Soil measurements may be influenced by external factors such as land use, general climate, parent material and topography.
- Sampling procedures
- pH of soil, particle size distribution, texture
- Soil holds moisture. Water is characterized equally well by its weight as by its volume. Soil moisture increases after precipitation. The amount of increase depends on many factors. Soil moisture decreases on dry sunny days. The rate of soil drying also depends on many factors.
- A soil moisture meter can be used to make an indirect measurement of soil water and content after calibration.
- Soils vary within a small local area. Soil properties are related to the soil forming factors. Soil can be classified according to its properties.
- Soil profiles can be described based on the five soil-forming factors. Soils within a small geographic area show considerable variety. Soil factors also affect soil moisture content and temperature.
- Measuring and recording data accurately. Estimates give a feel and data quality and estimates provide a way to pick out unusual data for further research
- Different objects can hold different amounts of water. When objects dry they release their water. Squeezing and evaporation are two ways to remove water. Soil water content is a measure of the amount of water in a soil sample. Soil water content varies around the world.
- Decomposition in soil depends upon different environmental conditions.

Land Cover/Biology

- Land Cover classes, MUC classification scheme
- Pixel Size, canopy cover, ground cover, tree height and circumference, grass biomass, dominant and co-dominant species
- GPS, field measurements/biometry
- Accuracy assessment allows us to evaluate our ability to map land cover. Once evaluated, accuracy can be improved using the knowledge we gain from the difference/error matrix.
- A map is a symbolic representation of a certain land area. The field of view is how large an area your eye or camera's eye can perceive. The field of view increases the higher the eye is relative to the ground.
- Objects in a remotely sensed image are interpreted and digitized into a code based upon the object's reflectance of bands of light. The image codes are relayed through a satellite dish to a computer for storage or enhancement. Image display is accomplished by conversion of stored data to a user-defined color-coded image.
- Orbiting satellites take photographs with cameras that are sensitive to a variety of different wavelengths. One of the main wavelengths sensed is the thermal radiation. The sensor reads the amount of heat being radiated and makes a picture out of the different values. When students observe something without touching it they are actually using their eyes, ears, nose and skin surface to remotely sense that object.
- Humans have an impact on the amount and type of land cover types. Animals and plants are affected when land cover types change. Humans need to be aware of the impact of land developments.
- Your 30 m x 30 m Biology Study Site can be considered a system. Your system contains certain elements within it such as trees, water, soil, rocks, and animals.

- A system has inputs such as sun's energy, water, carbon dioxide, oxygen, dust, and outputs like water, carbon dioxide, oxygen, heat.
- System boundaries will differ depending upon the question you are asking.
- In the spring, there is a period of bud-break, in which leaf buds appear and grow. In the fall, there is a period of senescence, in which actively growing plant material dies.
- Classification helps us organize and understand the natural world. In order for classification systems to be useful, we need to quantitatively determine their accuracy. Criteria are used to define accuracy levels.

GPS

- Latitude and longitude and mapping
- Relative and absolute direction, latitude and long, angles, use of magnetic compass, basic mapping, spacing
- Angles are measured in degrees, minutes, seconds, and in decimal degrees. GPS receivers use degrees and minutes to measure angles.
- If the latitude and longitude of one location cannot be measured directly, then they can be calculated by determining its relation to a nearby known location.
- Levels of measurement incorporate degrees of accuracy. There are mathematical techniques for dealing with degrees of accuracy.

Seasons

- Seasonal changes follow an annual cycle. Observable markers indicate transition points in the seasons. Seasonal changes demonstrate the interconnections among earth's systems.
- Seasonal patterns differ based on geographic locations. There is a lag time between the winter solstice and the coldest day of the year. Annual cycles in the seasons change from year to year. Seasonal temperature cycles vary around the world.